federal register

THURSDAY, SEPTEMBER 2, 1976

PART II:

ENVIRONMENTAL PROTECTION AGENCY

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WATER PROGRAMS

Secondary Treatment Information

ENVIRONMENTAL PROTECTION AGENCY

[40 CFR Part 133]

[FRL 586-2]

WATER PROGRAMS

Secondary Treatment Information

The purpose of this proposed rulemaking is to amend the Secondary Treatment Information regulation (40 CFR, Part 133). The proposed amendment recognizes that properly designed and operated waste stabilization ponds are a form of secondary treatment which may not be capable of achieving the suspended solids limitations contained in 40 CFR 133 without supplemental treatment processes for the removal of suspended solids. Amendment of Secondary Treatment Information is proposed to allow upward adjustment of the suspended solids limitations in cases where ponds which have a design capacity of one million gallons per day or less are used as the process for secondary treatment.

The Secondary Treatment Information regulation contained in 40 CFR Part 133 was promulgated pursuant to sections 301 and 304 of the Federal Water Pollution Control Act Amendments of 1972 (the Act). Section 304(d)(1) requires that the Environmental Protection Agency publish information on the degree of effluent reduction attainable through the application of secondary treatment within sixty days after enactment of the Act and from time to time thereafter. Section 301(b)(1)(B) of the Act requires that effluent limitations, based on secondary treatment, be achieved for all publicly owned treatment works in existence on July 1, 1977, or approved for a construction grant prior to June 30, 1974 (for which construction must be completed within four years of approval). Secondary Treatment Information was promulgated on August 17, 1973, and recently amended for deletion of the fecal coliform bacteria limitations and clarification of the pH requirement.

At the time 40 CFR 133 was proposed for public comment, the issue of the ability of waste stabilization ponds to achieve the proposed effluent quality in terms of suspended solids was raised. The Environmental Protection Agency recognized at that time that ponds as then in use generally had not been capable of producing effluents which are consistently low in suspended solids because of algae which result from the normal operations of ponds. The response of the Agency when 40 CFR 133 was promulgated was that it believed that with proper design (including solids separation processes in some cases) and operation, the level of effluent quality can be achieved with waste stabilization ponds.

In establishing the criteria for 40 CFR 133 and in considering comments submitted in response to its proposal, the Environmental Protection Agency was guided, in part, by the following: (1) The basic approach of Pub. L. 92-500 is directed at achieving incremental improvements in wastewater treatment practices and water quality, and (2) the legislative history of Pub. L. 92-500 clearly indicates that Congress intended that the secondary treatment regulation include controls on the discharge of suspended solids. Applying this basic guidance to waste stabilization ponds, the Agency has embarked on an extensive and successful research and development program to develop techniques for upgrading ponds since promulgation of 40 CFR 133. In March of 1974, the Agency published a technical bulletin entitled "Wastewater Treatment Ponds" to serve as a guide to the EPA Regional Administrators on design criteria for ponds. The technical bulletin, as well as the results of the research and development program on ponds, recognizes that in many cases upgrading techniques for the reduction of suspended solids go beyond traditional and even advanced pond design (i.e., two or more cells capable of series or parallel operation and controlled discharge) and require the use of supplemental mechanical devices such as filters.

Wastewater treatment ponds (lagoons) are widely used throughout the United States. Ponds have become very popular with small communities, primarily because of their relatively low construction and operating costs. As a result, nearly 90 percent of the wastewater treatment ponds in this country are located in communities of 5,000 people or less. Approximately 25 percent of the municipal wastewater treatment plants in the country are ponds.

In addition to the economic advantages that ponds afford to small and moderate size communities, there are additional benefits derived from the use of ponds for the treatment of wastewater. These benefits include the following:

1. Low energy requirements because treatment relies mostly on natural processes;

2. Successful operation is not dependent on highly skilled operating personnel;

3. Ponds are less subject to breakdown or malfunction than are mechanical plants;

4. Many ponds achieve low fecal coliform bacteria concentrations without a separate disinfection process or the use of chemical disinfectants.

Despite the inherent advantages associated with the application of ponds for wastewater treatment, particularly in small communities, there has been a considerable amount of controversy relating to ponds in recent years, as noted above. This controversy has centered around the issues of whether ponds can meet the suspended solids limitations required for secondary treatment. Secondary treatment (as defined in 40 CFR 133) is the minimum level of treatment required for all publicly owned treatment works. Effluent limitations required for secondary treatment are 30 mg/l or less of BOD and suspended solids on a 30-day average (or at least 85 percent removal, whichever is more stringent), 45 mg/l or less of BOD and suspended solids on a 7-day average, and pH within the range of 6.0 to 9.0.

Algae are naturally formed in municipal wastewater treatment ponds. Nonaerated ponds, which are the vast majority of municipal wastewater treatment ponds in this country, are designed to rely on photosynthetic oxygenation (i.e., oxygen from algae) for the oxygen needed for waste treatment. Thus algae, in addition to being a natural phenomenon in ponds, are also an integral part of the pond system.

Live algal cells do not readily settle even in the quiescent conditions occurring in the ponds. It is important to note, however, that the putrescible solids found in untreated or partially treated wastewater do readily settle in ponds which incorporate proper hydraulic design because of the quiescent conditions. The reason that most ponds cannot comply with the suspended solids limitations is because of algae.

Further indication and consequence of the fact that algae are not readily removed from pond effluents is that traditional pond design has not provided for the removal of algae and that historically pond performance has been measured in terms of BOD alone and not suspended solids. The suspended solids to BOD (five-day) ratio in most municipal wastewater (untreated and effluents from municipal plants) is generally in the range of 1:1 whereas the suspended solids to five-day BOD ratio in pond effluents can typically be as high as 2-4:1. Properly designed pond systems are reported to be generally capable of achieving the BOD limitations of 40 CFR 133; it is the suspended solids limitations upon which questions concerning the ability of ponds to meet the secondary treatment requirements have been based.

Methods for removing algae from pond effluents have been developed but have not been widely demonstrated in all climatic regions of the country. The most promising techniques developed thus far involve the use of sand or rock filters and may additionally require the use of chemical coagulants. Such systems generally have been developed to retain the features of low cost and simplified operation for ponds; however, supplemental treatment methods unavoidably add to the complexity of pond design and may strain the operational capability of small communities where the vast majority of ponds are used. Because of the increased complexity of supplemental systems for ponds and the emerging status of such systems at the present time, many pond users and state regulatory agencies have been reluctant to use them and have indicated it may be necessary to replace ponds which are incapable of achieving the limitations required for secondary treatment with mechanical treatment plants.

The Environmental Protection Agency believes that ponds play a vital role in the Nation's water pollution control strategy and that, because of their advantages of simplicity and low cost, ponds should be retained as an option for smaller communities. Furthermore, historically ponds have been considered as "secondary treatment" for smaller communities. The Agency also recognizes

that suspended solids due to live algae in pond effluents have fundamentally and substantially different characteristics than sewage solids or solids from other treatment processes. It is for these reasons that the amendment of the secondary treatment regulation to allow raising the suspended solids limitations for smaller ponds in accordance with the level of effluent quality achievable with pond technology is being proposed.

Special consideration is proposed for waste stabilization ponds in recognition of the fact that ponds without supplemental suspended solids removal processes may not be capable of achieving the suspended solids requirements of the Secondary Treatment Information regulation. The proposed amendment indicates that the suspended solids limitations of 40 CFR 133 may be adjusted to the level of effluent quality achievable by best pond technology, provided that: (1) Waste stabilization ponds are used as the process for secondary treatment, (2) the treatment works has a design capacity of one million gallons per day or less, and (3) performance data indicate that the treatment works cannot comply with the requirements of paragraphs (b)(1), (b)(2), and (b)(3) of § 133.102.

The proposed amendment allows the Regional Administrator (or the State, if the State has the authority to issue NPDES permits) to grant a variance with respect to the suspended solids requirements of 40 CFR 133 when establishing effluent limitations in NPDES permits for publicly owned treatment works which use waste stabilization ponds as the process for secondary treatment. A variance may be granted by the Regional Administrator or the authorized State agency, if the municipality can show that (1) the present system was designed in accordance with the traditional design of secondary treatment facilities, but (2) even if properly operated cannot meet the suspended solids limits of the secondary treatment standards, and (3) could not do so without the addition of treatment system elements not historically considered as secondary treatment (such as filtration systems). In granting a variance to a municipal pond user, the Regional Administrator or the State authority must specify the numerical suspended solids limitations which the pond will be required to meet; in no case, however, can facilities be exempted entirely from a suspended solids requirement. Effluent limitations for ponds established pursuant to the requirements of 40 CFR 133, including suspended solids limitations for ponds set in accordance with a variance procedure, will continue to be enforceable conditions of National Pollution Discharge Elimination System permits.

Variances would be granted to municipalities which apply for them based on the merits of individual requests and information specifically concerning the applicant and the pond facility under consideration. It is recognized, however, that it will be necessary for the efficient and effective implementation of a variance procedure for ponds for the Regional Administrator or authorized State agency to establish statewide or areawide limitations for the suspended solids concentrations achievable by best waste stabilization pond technology in that State or geographical area. Regional or State limitations would then be used as the basis for granting variances and setting suspended solids limitations for qualified ponds.

The proposed amendment authorizes the Regional Administrator (or the State) "to adjust the effluent limitations set forth in paragraphs (b)(1), (b)(2), and (b)(3) * * * based on the solids concentrations achievable by the best waste stabilization technology * * *" Regional or State acceptance and performance criteria for establishment of suspended solids limitations for ponds and for specific determinations concerning individual pond facilities must be set in accordance with this requirement. It it important to note that determinations of the "suspended solids concentrations achievable by best waste stabilization pond technology" must be based on ponds which are achieving the BOD limitations of 40 CFR 133. Such determinations will necessarily have to consider minimum pond design standards (e.g., hydraulic and organic loading rates, number of cells and operational flexibility) required for compliance with the BOD limitations of § 133.102(a), which remain unchanged.

In proposing this amendment to 40 CFR 133, the Agency also recognizes that approximately 40 percent of the municipal wastewater treatment ponds in this country discharge to waters where specific water quality standards are required pursuant to sections 301, 302, and 303. In accordance with section 301(b)(1)(c) "* * * any more stringent limitation including those necessary to meet water quality standards, treatment standards or schedules of compliance, established pursuant to any State law or regulations * * *" shall continue to apply in lieu of the requirements of 40 CFR 133, including a variance procedure for ponds. Accordingly, the granting of a variance for the suspended solids limitations ponds must consider any and all applicable water quality standards. Likewise, effluent limitations for suspended solids established in accordance with the variance must not cause water quality standards to be violated.

In proposing this amendment to 40 CFR 133 for small waste stabilization ponds, the Environmental Protection Agency does not intend to imply that supplemental treatment devices such as rock filters or intermittent sand filters are not acceptable methods for upgrading pond performance. Ponds which do not presently meet the discharge requirements pursuant to specific water quality standards can generally be economically upgraded to meet the required standards while preserving the basic concept of simplified operation. The Agency strongly believes that any large scale approach to replace ponds with mechanical plants would be ill-advised because the previously discussed advantages of ponds for small communities would be sacrificed.

Recommended methods for upgrading pond performance treatment requirements are detailed in the EPA Technical Bulletin on Wastewater Treatment Ponds (March 1974). Also available is the information presented at the Logan, Utah symposium on wastewater stabilization ponds. The report, entitled "Upgrading Wastewater Stabilization Ponds to Meet New Discharge Standards—Symposium Proceedings," presents the latest information on pond technology and stresses the methods by which ponds and pond design can be upgraded. Additional information on the subject of upgrading ponds is available from the EPA Technology Transfer Program.

Interested persons are invited to comment on the proposed amendments to Part 133 by sending written comments to the Office of Water Program Operations (WH-547), United States Environmental Protection Agency, 401 M Street, SW, Washington, DC 20460. Prior to promulgation of the proposed amendments in final form, all comments received on or before November 1, 1976 will be carefully considered. All comments received may be inspected at the above location during normal working hours by interested members of the public.

In consideration of the foregoing, it is proposed to amend Part 133 of Chapter I of Title 40 of the Code of Federal Regulations as set forth below.

(Section 304(d)(1) and 301(b)(1)(B) of the Federal Water Pollution Control Act Amendments of 1972 (33 U.S.C. 1342, 1345, and 1361)).

Dated: August 25, 1976.

ALVIN Z. ALM,
Acting Administrator.

Section 133.103 is amended by adding paragraph (c) as follows:

§ 133.103 Special considerations.

(c) The Regional Administrator (or, if appropriate, the State subject to EPA approval) is authorized to adjust the minimum levels of effluent quality set forth in paragraphs (b)(1), (b)(2), and (b)(3) of § 133.102 for any publicly owned treatment works, to conform to the suspended solids concentrations achievable with best waste stabilization pond technology, provided that: (1) Waste stabilization ponds are the sole process used for secondary treatment; (2) the maximum facility design capacity is one million gallons per day or less; and (3) operation and maintenance data indicate that the requirements of paragraphs (b)(1), (b)(2) and (b)(3) of § 133.102 cannot be achieved. The term "best waste stabilization pond technology" means a suspended solids value, determined by the Regional Administrator (or, if appropriate, the State subject to EPA approval), which is equal to the effluent concentration achieved 90 percent of the time within a State or appropriate contiguous geographical area by waste stabilization ponds that are achieving the levels of effluent quality established for biochemical oxygen demand in § 133.102(a).

[FR Doc.76-25523 Filed 9-1-76;8:45 am]